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Institutional Farms Test Facilities for Integrated Pest Management Strategies. An Abstract

National Field Research Center, Inc, Atlanta, GA

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INSTITUTIONAL FARMS:

Test Facilities For Integrated Pest Management Strategies

An Abstract

prepared by:

National Field Research Center, Inc. | Atlanta Field Office

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- an overview and rationale for an institutional program and its various sub-components;
- descriptions of the various governmental agencies (Federal, State and local) with a potential for involvement in such a program, and their relevant programs; and an overview of potential private sector and academic participants;
- a recommended methodology in which these agencies could cooperate to initiate such a program;
- specific techniques and programs which could be initiated at institutional farm project areas;
- a model IPM technician career structure, and the skills required; and
- recommendations for further research.

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INSTITUTIONAL FARMS:

TEST FACILITIES FOR

INTEGRATED PEST MANAGEMENT STRATEGIES

AN ABSTRACT

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Under Contract With:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Contract #WA-8-1861-A
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FOREWORD

The report Institutional Farms: Test Facilities for Integrated Pest Management Strategies presents a recommended framework for the development of a national program to implement integrated pest management (IPM) and scientific ecological agricultural (or eco-agricultural) practices and training programs on institutional farms. It is based principally upon a prototype model project implemented in 1977, in Memphis, Tennessee, on the Shelby County Penal Farm.

Specifically, the report presents:

- an overview and rationale for an institutional program and its various sub-components;
- descriptions of the various governmental agencies (Federal, State and local) with a potential for involvement in such a program, and their relevant programs; and an overview of potential private sector and academic participants;
- a recommended methodology in which these agencies could cooperate to initiate such a program;
- specific techniques and programs which could be initiated at institutional farm project areas;
- a model IPM technician career structure, and the skills required; and
- recommendations for further research.

The information and recommendations contained in the report were condensed from on-site interviews with over forty Federal and other officials, as well as from telephone conversations, correspondence, and extensive literature review. This Abstract represents an extreme condensation of the materials, by chapter, which were presented in the report. Included in the full report but not in the abstract, however, are a Bibliography and two Appendices: Project Contributors and the Correctional Facilities and Farms Directory. Those desiring information beyond that contained in the Abstract are encouraged to contact National Field Research Center in Atlanta, Georgia - (404) 433-2644.

BACKGROUND

Memphis Prototype

During the months of March through September, 1977, a model project to implement IPM and eco-agriculture on the Shelby County Penal Farm was carried out under the auspices of the U.S. Environmental Protection Agency. This project grew from a youth/family gardening program sponsored by Youth Service in Memphis, Inc. on land donated by the Penal Farm, to encompass the entire Penal Farm agricultural operations.

EPA provided technical assistance and support in the form of two summer interns, and through securing the services of National Field Research Center. Initial efforts by the project staff for the youth gardening project included developing contacts, publicizing the program, and enlisting the support of individuals and agencies. Through these efforts, donations of equipment, supplies and services abounded. These included the use of three vehicles, water storage units, seeds and tools, a trailer truck for storage, media support, office space, and a homemaking van for instructional purposes. Throughout the project, young persons and their families received instruction in scientific ecological gardening techniques; received assistance in planting and caring for their crops; and were assisted in harvesting their produce.

Activities undertaken to upgrade the Penal Farm's agricultural operations and implement IPM/eco-agricultural techniques included:

- the application of compost to the land;
- the involvement of Memphis State University;
- the completion of a farm plan;
- the development of a lagoon upgrading plan;
- consultations with several eco-agricultural experts;
- the use of non-chemical controls;
- the conduct of a farm dealer demonstration school.

Selected Penal Farm residents were allowed to garden with their families in conjunction with the youth gardening project. Additionally, interested inmates attended films, slide demonstrations and discussions regarding IPM and eco-agriculture, and steps were taken to develop a curriculum in agriculture for these individuals.

Some of the more notable outcomes of this project were:

- numerous youths, families and inmates were provided the opportunity of learning to plant and care for gardens;
- families were able to partially offset spiraling grocery bills by growing their own produce;

- interest grew throughout the network with regard to scientific ecological farming;
- an increased interest was developed in support of an agricultural curriculum for residents of the Penal Farm; and
- the potential for integrated gardening/farming projects based upon IPM and eco-agricultural principles and techniques was demonstrated, providing a basis for future replication and expansion.

Current Project

The apparent successes of the Memphis project prompted EPA to provide for further study concerning the replication/expansion of the project on a national scale, and it again acquired the services of National Field Research Center. With the objective "to facilitate the ultimate acceptance of integrated pest management as a nationally accepted agricultural practice through a strategy analysis for future demonstration models in the institutional farm setting", the firm agreed to:

- develop a national procedural program leading to the utilization of institutional farms as IPM demonstration models;
- identify and define IPM techniques and procedures applicable in the institutional farm setting;
- identify individuals/offices within Federal agencies/ national organizations with activities and objectives paralleling the field of IPM, and to elicit their interest in the model institutional farm concept; and
- identify and categorize individual skill sets required in the successful application of IPM in the institutional farm setting.

The chief strategy has been interviewing Federal officials in agencies/ offices with activities and functions that relate to an institutional IPM/eco-agricultural program. However, the report provides limited background on the potential involvement of the private sector and academic community, and stresses the importance of their eventual role in a national program.

INTRODUCTION

An institutional farming and gardening project such as was carried out in Memphis consists of a number of separate but interrelated components. In order that the reader have a background on these components, the Introduction to the report presents an overview of the major fields relating to the Memphis project and being recommended for future projects. Below, the major points of each component are capsulized, with the following major divisions: Agricultural Components and Corrections Components.

Agricultural Components

Integrated Pest Management

A strong and growing dependence on chemical pesticides in recent years has led to concerns about a number of pesticide-related problems, including: environmental contamination; resistances developed by some pests to commonly used pesticides; adverse health effects on humans and animals; outbreaks of secondary pests as a result of the complete elimination of other pests; and resurgences of original pests from eliminating natural predators.

These concerns have led to an increasing interest in and application of IPM strategies as alternatives to pest control problems. Although the definition of IPM varies, IPM systems incorporate considerations of all the tools and methodologies available; the effects on the food produced; the costs to the farmer and consumer; and the effects on the environment, animals and humans. IPM techniques being researched and implemented by Federal, State and local governments, academic institutions, growers, and private business and industry include: using crop varieties resistant to pests, releasing natural pest enemies, adjusting planting times and crop rotations, implementing cultural practices such as row spacing and flooding, and using pesticides when deemed necessary.

Scientific Ecological Agriculture

In concept, scientific ecological agriculture is a cross between conventional agriculture and alternative forms with names such as organic, natural and biological agriculture. While these alternative forms have varying characteristics, they generally use little or no synthetic pesticides or fertilizers; emphasize feeding plants indirectly, through the soil; and attempt to restore proper soil conditions, often through adding humates or humus. Proponents of these systems claim that such techniques increase the health of the soil, which in turn provides a natural resistance to pests; and that less rainfall is required to maintain healthy crops.

Scientific ecological agriculture, then, borrows alternative techniques such as composting, and borrows from conventional agriculture when occasion calls, to carry out the most efficient, economical, productive, and scientific agricultural operation possible - while remaining as environmentally sound and energy-efficient as possible.

Energy and Agriculture

It has been hotly debated whether or not agriculture is the largest energy consumer in the United States. Its direct energy consumption takes place chiefly through the operation of tractors and other farm equipment, and through irrigation, crop drying and other agricultural processes. An indirect energy use by agriculture comes through the use of petroleum-based pesticides and fertilizers.

U.S. scientists are researching and testing alternate energy sources for agricultural production, as well as conservation strategies. Some alternate forms being tested include: solar energy for crop drying, irrigation and the heating of farm structures; wind energy for pumping water and generating electric power; crop residues and manures (biomass) for conversion to usable energy forms; and heat recovery from air exhausted from animal shelters and crop dryers. Recommended energy conservation measures include equipment changes and adjustments, new management practices, reducing overdrying, and combined field operations.

Gardening

Community gardening is on the uprise in the U.S., as surveys show that a great many Americans want to grow crops but lack the land and know-how required. In addition to providing food for families, community gardens provide such useful functions as a constructive recreational outlet, an aid to heightened awareness of nature and environmental processes, and a facilitator of the "sense of community". Gardening is an educational process, and some assert that it fosters individualism, self-reliance, and creativity. Most community gardening projects are sponsored by local groups; however, State and Federal agencies are also supporting such programs.

A number of universities, correctional institutions, hospitals, nursing homes, and mental institutions are recognizing the therapeutic value of gardening, and are initiating "hortitherapy" programs. Hortitherapy has been defined as the use of horticultural appeal and methods for improvement of physical well-being. Types of individuals served have included the visually, mentally, and physically disabled; substance abusers; the elderly; and adult and juvenile offenders.

Corrections Components

The Offender

An estimated 500,000 individuals are currently confined to Federal, State and local institutions and jails. While the offender population is far from a homogeneous group, the typical offender is likely to be a young, undereducated male from a minority background. The economic history of most offenders is one of long periods of unemployment, low wages, low status, and welfare; however, as a whole the offender population is as intelligent as the "outside" population. Although 95 percent of those incarcerated are men, the number of arrests of women is rapidly increasing, and the types of offenses committed by women is expanding.

Studies have shown that society places a stigma upon the offender and ex-offender, often taking the form of refusal for employment, and through restrictive licensing laws. This problem is compounded by the fact that many ex-offenders do not have sufficient job skills.

The Correctional System

The correctional system in actuality includes four major components: police, prosecution and defense, courts, and corrections. The latter consists of a complex network of correctional institutions, half-way houses, and other facilities throughout the country, including: the Federal prisons of minimum, medium and maximum security, and community treatment centers; similar institutions for State adult offenders; youth custody and/or treatment facilities; and local detention and correctional facilities.

The goals of correctional institutions today are varied, ranging from punishment to rehabilitation. Reform attempts today are marked by infusions of funds for models, studies, panels, research and other efforts. Recent and on-going efforts include pre-trial intervention; job training, counseling and placement; token economy implementation; the development of prison industries; and post-prison adjustment assistance. It is not yet clear what effects, if any, these programs have on prisoner reform.

Institutional Vocational Skills Training

Surveys of vocational training in correctional institutions indicate that between 10 and 20 percent of all inmates are enrolled in such programs, the most common being: automotive mechanics, arc and acetylene welding, machine shop, masonry, radio and TV repair, auto body repair, carpentry, barbering, baking and cooking, architectural and mechanical drafting, air conditioning and refrigeration, and small engine repair. About one-half of all inmates are apparently unable to participate in vocational training for reasons such as lack of aptitude or interest, and inability to meet minimum requirements. Many institutions also offer prison industries.

The relationship between acquiring occupational skills and recidivism is not clear, but evidence suggests that training coupled with full support services reduces a person's likelihood of returning to crime. Among the recommendations being advanced for vocational training in prison are: provide a greater diversity of offerings; expand community contacts; improve guidance and placement services; institute apprenticeship programs; cooperate with the military; use CETA and other funds; and expand upon the Free Venture model.

Institutional Farming

Literature is scarce on correctional institutional farming operations, but it appears that most farms have declined in quality and quantity (output) over the last thirty years. Reasons include: a shift in attitudes regarding hard labor for inmates; lack of funds; and the economic feasibility of buying rather than producing the institution's food. Today, while some inmates work in agricultural operations, few are provided formal agricultural training.

It appears that interest is reviving towards re-developing the potential of penal institutional lands. Reasons include the spiraling costs of purchasing food, and pressure from without to reduce these costs. A good many of these institutions have an abundance of land to work with, as indicated by a survey conducted by the American Correctional Association in cooperation with the Environmental Protection Agency. This survey is published as Appendix B of the full report.

SKILLS FOR THE IPM PRACTITIONER

Only recently have curricula in IPM become available. Today, many colleges and universities throughout the country are offering bachelor and graduate level educational programs in pest management, producing professionals with the capabilities of providing expert consultative services and and performing research in the field. However, comprehensive training programs at the two-year level and below in IPM are not so common, as indicated by a 1977-78 survey by National Field Research Center.

Two sources have been identified for IPM curricula, at the associate degree level and below. These are abstracted in the following two sections.

Integrated Pest Management Curriculum Report

In 1973, Kirkwood Community College of Cedar Rapids, Iowa and the Associated Research Corporation of Miami, Florida developed a report entitled Integrated Pest Management - A Curriculum Report. It consists of materials developed at and in conjunction with a conference in Berkeley, California, and presents outlined courses of study up to the doctoral level, as well as IPM jobs at each level and the competencies required. Below are the jobs outlined for the two-year level and below. The full institutional farming report details the specific skills required for each job.

High School Level:

Applicator Jobs
People-Oriented Jobs
Technician Jobs

MDTA Skills Center Level (for direct occupational entry):

Applicator
Applicator Assistant
Field Sweeper or Scout
Equipment Operator
Laboratory Assistant
Insectary Technician Assistant
Field Equipment Technician
Inspector Trainee

Community College and Technical Institution Level:

IPM - Laboratory Services

Laboratory Technician: Biological
Laboratory Technician: Chemical
Insectary Technician
Environmental Monitoring Technician
Field Sweeper/Scout

IPM - Application Services

IPM Foreman
Field Equipment Technician
Aerial Applicator
Structural Applicator

IPM - Supplies and Services

Retailer
Salesperson
Technical Salesperson

A Source Book on Integrated Pest Management

In 1977, Mary Louise Flint and Robert van den Bosch of the International Center for Integrated and Biological Control of the University of California, developed and released A Source Book on Integrated Pest Management. It contains curriculum content in environmental education in the context of IPM, and can be used as a base to design and develop curriculum and relevant instructional/learning resources in instructional leadership education such as teacher education, and in the education of children and youth, and in adult/continuing education. Accompanying materials present competence domains relevant to the Source Book for education and teacher education in IPM.

Discussion

IPM-related education/training and career ladders are as yet largely unstructured, especially at lower levels. The above two sources will be useful to those attempting to implementing IPM training programs and career systems. Some suggestions for such implementation in the institutional setting include:

- structure programs around job market needs and institutional variables;
- structure flexibility into the training programs;
- make use of available supportive individuals, institutions, and teaching aids;
- incorporate on-the-job training and field experience;
- provide supportive services such as job counseling and placement; and
- provide for follow-up training.

POTENTIAL PROJECT PARTICIPANTS

This chapter in the full report presents descriptions, based upon interviews and research, of agencies and institutions which have activities and functions that relate, or potentially relate to an institutional IPM/ eco-agricultural program. As such, they have potential involvement in a national program. The first area, Federal Agencies and their State/Local Counterparts, describes appropriate Federal agencies by their general functions and activities; reviews specific sections and/or programs of these Federal agencies with potential linkages; and reviews State and local public agencies whose functions are at least partially tied to the Federal agencies described.

The second and third sections, Academic Institutions and Private Sector, provide very brief descriptions of the potential involvements of these sectors, as the scope of the project neither permitted nor stipulated the extensive work necessary to provide thorough coverage. Any extensive work towards implementing a large scale institutional farming program must give due consideration to the academic community and the private sector.

Below are outlined the agencies/institutions receiving coverage in the full report.

Federal Agencies and their State/local Counterparts

LEGISLATIVE BRANCH

U.S. Congress Office of Technology Assessment

EXECUTIVE BRANCH

Executive Office of the President, Council on Environmental Quality

Departments:

Department of Agriculture:
- Conservation, Research and Education
  - Science and Education Administration
    - Cooperative State Research Service
    - Extension Service
    - Federal Research
    - Teaching
  - Soil Conservation
- Economic Statistics and Cooperative Service
- Rural Development

Department of Energy:
- Conservation and Solar Applications
  - Division of Industrial Energy Conservation
  - Solar Technology Transfer Branch
- Intergovernmental and Institutional Relations

Department of Health, Education and Welfare:
- Office of Education
  - Bureau of Elementary and Secondary Education
    - Office of Environmental Education
  - Bureau of Occupational and Adult Education

Department of Justice:
- Bureau of Prisons
- Law Enforcement Assistance Administration

Agencies:

Community Services Administration

Environmental Protection Agency

Academic Institutions

Land-Grant Institutions

Other Four-Year Advanced Degree Institutions

Two-Year Institutions

Private Sector

National/State/Local Organizations

Business and Industry

POTENTIAL PROJECT COMPONENTS

This chapter in the full report summarizes the activities and projects recommended by interviewed officials, those identified through literature review, and/or those successfully implemented during the Memphis project. Specific components actually initiated at a particular project area would depend upon several factors including crops grown, pest problems, soil types, weather and climatic conditions, acreage, the size and population of the institution, the priorities of the participants, and the resources available. Potential project components are briefly summarized below, by major category.

IPM/Eco-Agriculture

Specific strategies would vary with the situation. It is suggested that an initial project should be to work with the Soil Conservation Service for an area conservation plan. Establishing cooperative relationships with Federal, State and local agencies, academic institutions, and the private sector would also be crucial to successfully implementing IPM/eco-agriculture. Working with researchers would facilitate "technology transfer" of the latest techniques. In a more commercial vein, agricultural operations could be linked with, in some way, existing prison industries programs.

Gardening/Horticulture

Suggested participants include youths and their families, elderly persons, inmates and their families, and mentally and physically handicapped persons. Suggested activities include training participants in gardening techniques along with classes in related areas; soliciting support from local volunteers, high school and college students; and establishing liaisons with local food fairs. It may be feasible to assist in establishing additional gardening sites in nearby cities and/or build greenhouses or propagation chambers. A related possible activity would involve the maintenance of lawns in an energy-efficient manner.

Energy Conversion/Conservation

Possible energy conservation measures could include proper insulation, adjustments of equipment, combining field operations, when possible, and reducing tillage when appropriate. On-farm energy production possibilities include the use of biomass for heating buildings and drying crops; the use of solar apparati for heating buildings and water; the construction of wind turbines for electricity and pumping water; and the construction of small hydropower projects. Again, it is stressed that project participants draw upon all of the expertise that is available.

Corrections

In addition to providing training to offenders in eco-agricultural and IPM skills, as outlined in a previous chapter, it has been suggested that involved institutions could tie-in with the solar installer training program for correctional institutions, provided by the Department of Energy. Additionally, some have suggested that research and demonstration projects concerning the offender could be conducted by private or public research bodies in conjunction with an IPM/eco-agricultural program.

Outreach/Promotion

A very important factor for a successful program is obtaining the support and cooperation of the community-at-large, as well as special interest groups, local government, and private organizations. Suggestions for such efforts include:

- speaking before local civic organizations, youth groups, schools and other organizations;
- paying personal visits to key public officials as well as to local farmers and business and industry representatives;
- contacting and preparing news releases for newspapers and TV stations; and
- inviting guest speakers on appropriate topics, and opening the talks to the public.

ADDITIONAL CONSIDERATIONS

The great majority of those interviewed during the course of this study expressed much enthusiasm regarding the merits of an institutional IPM/eco-agricultural project. Many felt that a unique and exceptional aspect is that such a project has the potential of providing benefits to a number of disciplines. Several of the interviewed officials, however, pointed out potential obstacles to the successful implementation of an institutional program and/or suggested areas for further research or study before actual project, which were not within the scope of this project. These potential obstacles and areas for further research are listed below. Discussions of these can be found in the full report.

Potential Obstacles

1. Placement of Trainees:
   A. The job market for IPM and other agricultural skills may not be good enough to justify the development of training programs in these areas.
   B. Many IPM/eco-agricultural jobs are seasonal in nature.
   C. Farmers may not be willing to hire former inmates.

2. Economic Feasibility:
   A. It may be more economical for institutions to buy their food, while leasing their land to local farmers, as raising their own food may cause extra expenses for additional guards, more equipment, etc.
   B. Implementing IPM and eco-agricultural techniques may prove less cost-efficient than conventional methods.
   C. Many institutional farms may be located on poor land for agricultural purposes, and may be located far from any population centers.

3. Sale of Produce:
   A. Local farmers may resent competition from a public institution.
   B. Many States have laws forbidding prison industries which compete with private enterprise.

4. IPM policy within and among Federal agencies, as well as with other public and private groups, is only in its formative stages.

Areas for Further Research

In response to Potential Obstacles:

1. A national survey on employment opportunities in IPM and related areas.

2. A national survey on attitudes of potential employers towards the hiring of ex-offenders.

3. A national survey on correctional institutions, on such factors as land characteristics, crops and pests, management practices, philosophies, etc.

4. An analysis of probable economic effects on institutions of an IPM/eco-agricultural program.

5. A survey of all State and Federal laws and policies relating to institutional farming, sale of produce, inmate wages, and other relevant factors.

6. A survey of unions and farmers on their attitudes towards the sale of produce by institutional farms.

7. A survey and analysis of Federal legislation relevant to IPM/eco-agriculture - especially as these laws impact the roles of Federal agencies.

Other suggested further research:

1. A survey on other institutional land, e.g., Department of Defense, hospitals, geriatric facilities, that could be used for gardening/farming programs.

2. A comprehensive survey of all curriculum materials developed either by institutions or under grants/contracts in support of both IPM and eco-agricultural techniques.

3. Convene a working conference of identified authorities in the IPM and eco-agricultural fields to identify gaps in existing curricular offerings and develop plans for filling such gaps.

4. A more detailed analysis of potential private sector and academic community participants.

PLAN OF ACTION

One of the objectives of this study was to develop a procedural program leading to the utilization of institutional farms as IPM demonstration models. With the completion of this study, sufficient interest has been identified in the various agencies to warrant the development of a co-ordinated program for implementing an institutional program on a large scale. In the process of conducting the interviews, ideas were solicited as to the manner in which such a large scale program could be implemented. Below are briefly outlined the suggestions consistently received and recorded.

Conduct an Institutional Study

An integral part of any future work must be the provision of more detailed information on the institutions to be involved, with all institutions informed of the possibilities. Institutions should be categorized on such factors as acreage under cultivation, climatic conditions, type of institution, availability of educational support systems, and others. The result should be a rank ordered listing of potential project participants.

Establish an Interagency Advisory Group

To bring a national program to reality, it will be necessary to "officially" involve interested agencies, and establish a responsible body in charge. The formation of a core interagency advisory group should be backed by formal interagency agreements, while other agencies and groups not in the core could establish their roles with letters of intent. At the outset, the configuration on the following page could depict the advisory group.

Involve the Private Sector and Academic Community

It should become a major responsibility of the advisory group to provide for the involvement of these extremely important support groups.

Develop a Long Range Budget

It should be an initial responsibility of the advisory group to develop basic financial projections for at least a five-year period. A primary goal will be to lead the involved institutions in the direction of economic self-sufficiency - which will not happen in one or two years.

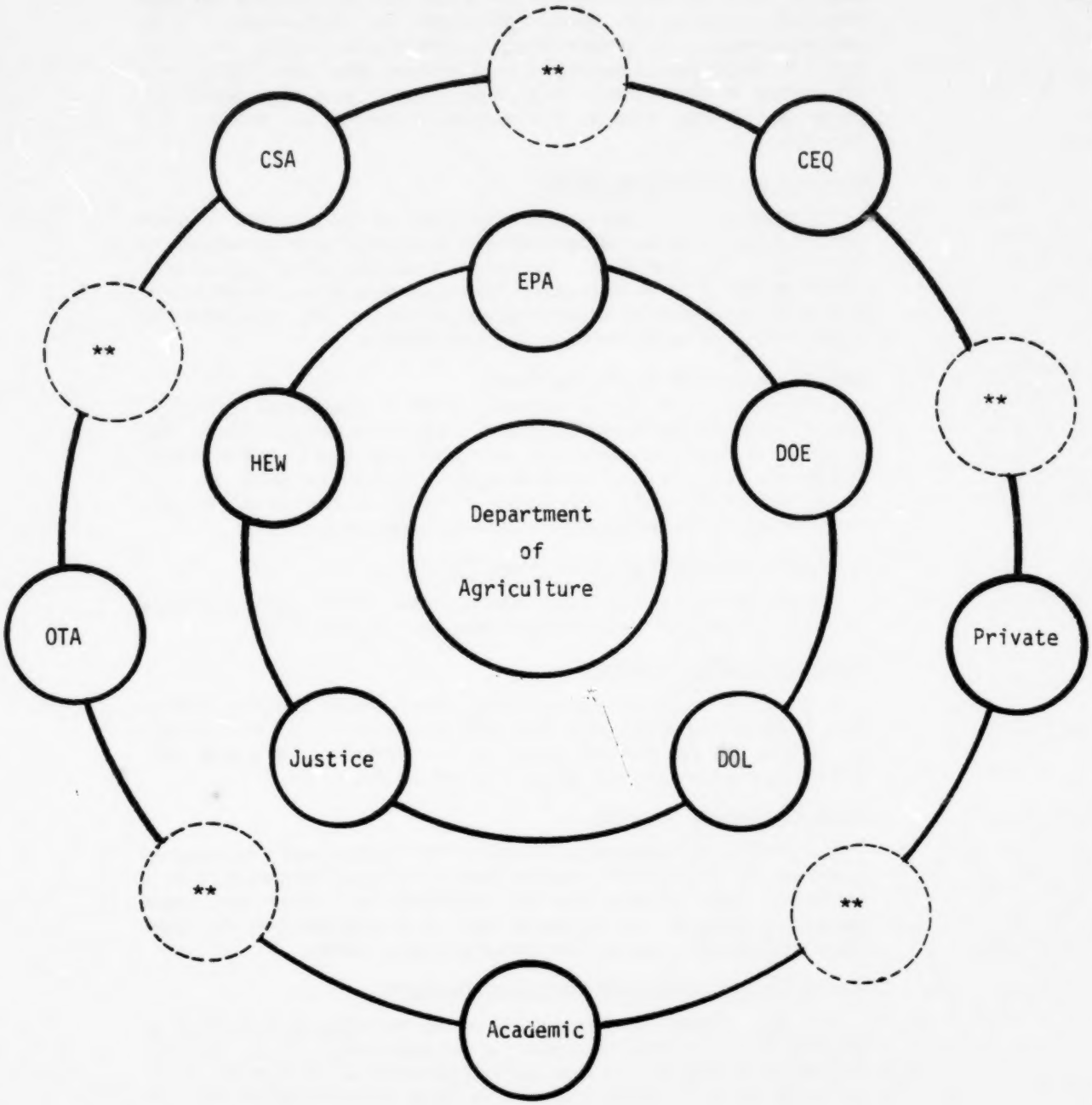
Establish Realistic Timelines

It should be an initial responsibility of the advisory group to draw up guidelines for participation, making plans for program expansion over a number of years - phasing new institutions into the program and, where appropriate, phasing older programs out. It is suggested that the initial planning stages will consume from twelve to fifteen months.

Provide Technical Assistance and Support Personnel

Technical assistance and support personnel are necessary ingredients to program success in the preliminary and implementation phases. Initially, assistance should be secured from contract personnel to carry out the formative tasks. As the program progresses, assistance will be needed to carry out the mandates of the advisory group, to monitor institutional operations, to assist in securing other appropriate expertise, and for other tasks necessary to successfully implement viable programs.

PROPOSED INTERAGENCY ADVISORY GROUP CONFIGURATION



** Other interested agencies as evidenced by letter of intent.

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National Field Research Center, Inc. (NFRC) is a multi-disciplinary consulting firm headquartered in Iowa City, Iowa with branch offices situated in Washington, D.C.; Atlanta, Georgia; and Denver, Colorado.

NFRC has maintained an impressive record of active accomplishment in areas as diverse as systems design, management, survey/evaluation and program assessment. The wide range of disciplines represented by the staff, and the educational qualifications held by each, provide for such diversification.

Over the past six years, National Field Research Center and its affiliates have provided consulting services to federal, state and local governments, as well as to the educational community and the private sector. Professional assistance in the form of research, systems design, and program implementation stands as an identifiable product.

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